

100% Renewable Energy Cranston by 2030

*The First Step Toward the Renewable Energy Economic Transition for
Rhode Island*



**Prepared by Ocean State Community Energy for
the Rhode Island Progressive Democrats**

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Phase I Summary

INTRODUCTION

The impacts of climate change and the use of fossil fuels are causing potentially irreversible effects on our health, our economy, and our environment. To combat this and prevent the very worst effects, there are several pathways that our state has begun to explore. One of these journeys is the transition to 100% renewable energy.

This proposal summary highlights the reasons why it is so crucial for the City of Cranston and the State of Rhode Island to make the switch to all renewable energy and presents a vision for what a 100% Renewable Cranston could look like. The climate arguments and the necessity of energy and environmental justice at the core of the transition through recognition, distributional, and procedural justice will be left to the publishing of the full report for Phase I and the final state report. Here we will touch on climate, health, and sustainability issues mainly through the lens of economic development and prosperity in the new clean-tech age. While we will present potential actions that can be taken and potential ways of covering costs towards this initiative, the details of how to achieve it and where the funding for this transition comes from, as well as what potential processes need to be updated or altered must be left to the ingenuity and determination of Rhode Islanders. This proposal represents the first phase of our work on the transition. As we continue modeling at the potential project sites, we will meet with city, business, community leaders, and the community at large to listen to and learn from their thoughts and ideas. You can follow the process through updates and news at oceanstatece.info.

With the transition to 100% renewable energy being successful, Rhode Island will achieve savings in the ongoing energy expenditures needed for economic production. As a result, we will be rewarded with a quality of life that is acceptable—and preferable to our current one. There will be a much more stable climate, with a greatly reduced health and environmental impact from energy production activities that cause pollution in our air and water.

The Need For This Transition

Coal, oil, and natural gas take millions of years to form in order to become usable energy sources. The process requires life to die and remain contained in an ideal geological formation with just the right amount of heat and pressure. *Sustainable energy is defined as an energy system that is able to meet the needs of the people today, without compromising the ability of future generations to meet their needs* (Lemaire, 2010). Because fossil fuels take millions of years to develop, it would be impossible for us to create a system that would allow us to constantly create new fossil fuels for future energy use. Once it is gone, we will never get it back. *It is predicted that we only have 53 years left of oil, 54 years of natural gas, and 110 years left of coal* (Singh, 2015). If we want to see a future where we all have a consistent and safe supply of fuel sources to meet the ever-increasing demand for energy, we must make the change from the outdated ways of the past and start building for the future now.

A problem that goes hand-in-hand with our use of fossil fuels is the way in which our electricity is currently distributed: in a system that is commonly referred to as the grid. The current grid model focuses on having a handful of extremely large, centralized energy production stations throughout the country. These large production facilities produce and distribute energy to a wide array of places. The

current model is only a one-way street, with the energy only flowing from the power plants to the energy users. This system comes with a multitude of issues, most notably how inefficient it becomes when transported over distances.

Whenever electricity is being created, no matter how it is being done, it is impossible for it to be 100% efficient. However, *electricity provided by fossil fuels tend to only be about 33% efficient, losing 2/3 of the potential energy. Much of that loss stems from the fact that after the electricity is produced, it must travel a large distance to power homes and businesses, losing more energy the further it has to go.* (Metcalf, 2017). In addition, there is a lack of electricity storage in our current system, and that energy is only produced when there is a demand for it. When you flip a light switch on in your house, a power plant starts to burn a little bit more coal or natural gas. These systems are not designed to store any sort of extra energy in an emergency.

A smart micro-grid can solve these issues. When Cranston becomes 100% renewable: residents and businesses will have solar panels on their roofs, vertical wind turbines installed, possibility of micro hydro power, and newer, emerging green technologies. All these different sources would contribute to the Cranston grid, and many of the consumers of that electricity would also be producers. The electricity does not need to be shipped in from an inefficient out-of-state power plant, it can be all produced and consumed locally. If too much is produced, it can be stored and saved for an emergency or distribution. It would allow for Cranston to become energy independent, and self-sustainable, as well as increase potential for advancement.

Opportunity & Benefits

The benefits of a 100% renewable Cranston are much clearer when viewed at the local level. With a reduction in fossil fuel use and the reduction of local emissions from, for example, cars, there would be less air pollution. When Cranston makes the transition to renewable energy through the electrification of transportation and the heating/cooling of our homes and businesses, local air quality will significantly improve.

Cranston would also benefit from greater energy independence. With fossil fuel energy provided by local utilities, each home is connected to its distribution grid and relies on it for electricity. If storms or other interruptions happen, all those connected to the current grid are at risk of losing power. Multiple sources of renewable energy, a decentralized smart grid, and energy storage will allow users to tap into sources far less vulnerable to city-wide power outages. Beyond that the city will see a significant increase of high paying renewable energy jobs like solar installation, consultation, energy efficiency technicians, etc. Lastly, through these actions all residents would benefit from clean renewable energy, lower energy costs, and healthier air.

Economic Benefits

One of the most notable economic benefits of sustainable energy are the jobs created throughout the many sectors within the industry. The solar industry alone currently employs over 260,000 Americans, almost three-and-a-half times as many jobs as the coal industry. The wind power industry has over 100,000 jobs, and an article published by NREL states that wind power technician was the fastest growing job in the country (Richardson, 2018). According to the Political Economy Research Institute at the University of Massachusetts, \$1,000 invested in solar produces 14 jobs, compared to coal and natural gas that only produces 5-7 jobs. This has to do with the fact that renewable resources are more

labor intensive, they require human installation and technicians to maintain them, resulting in more jobs per dollar spent.

In addition to local job creation, investing in a green energy economy keeps more money circulating locally. The Union of Concerned Scientists performed an analysis on the economic results of implementing a national standard of only 25% renewable energy by the year 2025. It resulted in “\$263.4 billion in new capital investment for renewable energy technologies, \$13.5 billion in new landowner income from biomass production and/or wind land lease payments, and \$11.5 billion in new property tax revenue for local communities” (Union of Concerned Scientist, 2017).

Renewable energy generation can save significant money for consumers and municipalities. At the household level, investing in sustainable energy can save families money. While there is an initial investment cost of installing solar panels, they have a lifetime of approximately 30 years and take, on average, five to seven years to be paid off. The company Mosaic has estimated that, on average, a home that installs solar panels saves around \$67,000 over the life of the panels (Renewable Energy Corporation, 2018). That's about \$2,700 every year that will be staying with your family.

How 100% Renewable Energy Can Be Achieved

As of 2017, Rhode Island had the lowest per capita energy consumption among all states. While lower energy consumption is a good thing, the goal is to get to 100% renewable energy sources for all our energy demands. The energy needs of Cranston can be met with solar, small vertical onshore wind, remote solar agreements, an updated smart grid, and improvements in energy efficiency measures. This includes all electricity needed to power lighting, appliances, space heating (heat pumps), hot water heating and transportation, if everyone were to get an electric car.

This will need to be rolled out in stages and require support from state and local officials, federal funding, energy utilities, and local business. Most importantly it will require buy-in from members of the community. Many of the municipalities across the country that have begun the transition to 100% renewable energy to date have set their targets between the years 2040 and 2050 and they do not include heating or transportation. We believe the city of Cranston and the state of Rhode Island can meet this goal by 2030, including the transition of heat and transportation.

The basic facts and challenges of this transition are identical to most other existing municipal 100% renewable energy plans. Throughout its history, Rhode Island and Rhode Islanders have pushed forward and blazed a trail of progress that showed the path for others to follow. Rhode Island was the birthplace of the American industrial revolution so why not position itself to someday being known as the birthplace of the renewable energy revolution? This is a state of just over one million people and it is made up of the smallest land area of any state in the union, but those numbers make it all the more probable that the state will succeed and lead the rest of the country and the globe into a new energy world and economy.

Cranston used 473,756.77 MWh of electricity in 2018, and with added efficiency, that number can be reduced to 407,472.77 MWh. Rhode Island currently has the third lowest energy use per capita in the U.S. today and the state has a robust energy efficiency program already in place. By implementing this energy efficiency program, the average building can realize a 10% to 20% reduction in electricity used, with some buildings able to realize up to a 50% reduction. By taking the lower average target number of

14% we can reduce the city's 2018 energy usage by 66,284 MWh, resulting in substantial savings.

With power generation coming from residential, brownfield/industrial, and commercial solar arrays, and onshore wind throughout the city, Cranston can generate more than 407,472.77 MWh, and the city would have 100%+ of its current energy needs covered with zero impact to green space.

An additional 142,127 MWh of energy will become available with smart shared storage solutions connected to a smart micro grid, which we predict will produce up to a 30% increase in efficiency based on current technology. This creates a decentralized energy storage array with monitoring and updating in real-time, eliminating the need for increased import from out of state utilities during peak times of usage or emergencies. The additional energy from a smart and shareable micro-grid/energy storage system combined with just 5% of the power generated from offshore wind projects currently underway, will allow Cranston to add residential and commercial heating and transportation and make a complete transition to renewable energy by 2030.

Clean Energy Economy For Cranston & Rhode Island

Rhode Island became the first state in the country to establish an offshore wind project in 2016, and the state's labor and job-training department is now building out a career pipeline program for students at local schools who are interested in the offshore wind industry. The state is already a leader in energy efficiency and moving towards forward-thinking goals such as becoming the largest offshore wind producer in the United States, modernizing the state's grid, and putting a price on carbon emissions.

Over 260,000 Americans are employed by the solar power industry and 100,000 by the wind power industry. In 2017 wind power technician was the fastest growing job in the country. On the solar side the median pay of the high demand cleantech job of solar PV installer is about \$40,000/yr while a wind power service tech job is \$52,000. The demand for workers with these skills will skyrocket in Rhode Island and that demand will ensure the continued upward trajectory for pay. As an example of the current trends and demand, wind power contributes about \$20 billion a year in value to the US economy, and it has been projected that amount will rise to \$24 billion in 2020.

Renewable energy contributes far more economically than simply jobs and pollution reduction. An IRENA report includes a reference to how stimulating renewable energy investment can be. "Doubling the share of renewables in the global energy mix by 2030 would increase global GDP by up to 1.1% or USD 1.3 trillion. The report shows that such a transition increases global GDP in 2030 between 0.6% and 1.1%, or between around USD 700 billion and USD 1.3 trillion compared to business as usual."

Another key point is the amount of manufacturing that could take place here in Rhode Island as local demand is enhanced just as it has been in other areas across the U.S. More than 50% of a U.S.-installed turbine's value is produced in America, a twelve-fold increase from just a few years ago. Some turbine manufacturers plan to make 100% of their components in America, and the trend is expected to continue. Many companies following this initiative are already mentioning the possibility of moving operations or manufacturing to the Ocean State.

Researchers at UC Berkeley studied the climate and health benefits of solar and wind power in the US and came up with equally huge benefits. "The climate benefit estimates ranged from \$5 billion to \$106 billion, with an additional \$30 billion to \$113 billion in air quality and public health benefits." On the low

end, the combined values are \$35 billion in benefits. At the top, it has the number at \$219 billion. With Rhode Island taking the lead in offshore wind generation, efficiency, pricing carbon, and more, a significant percentage of that production and revenue would be brought back to the state.

What Comes Next & How You Can Get Involved

Through individual donors, campaigns, and municipal contracts, we are working to raise the \$4 million necessary to complete this project within the timeline that has been set all the while paying a living wage to every one of our contractors and workers. When we are successful in this endeavor, Rhode Island will have proven that a grassroots campaign of committed citizens can change the trajectory of our pathway towards leading the new energy economy and providing a healthy, vibrant future for our children and future generations in the Ocean State. It could also mean future dividend checks for every Rhode Islander, vastly improved state energy infrastructure, the cessation of money pouring out of the state to meet its energy needs, and a new revenue source for the state and municipalities.

Based on the success of the Phase I feasibility report and the excitement following our event in Cranston this past November, we have launched our Phase II initiative. This will produce a statewide study and report to be completed by August 1, 2020. This will include the overall report and roadmap for the state to get to 100% renewable energy by 2030. This comprehensive statewide report will be part of a new online tool that can be updated and added to by municipal and state leaders as technology and deployments change so that Rhode Islanders can following the roadmaps laid out here.

Starting in January of 2020, we will be sponsoring events around the state to listen to and act on your ideas, answer questions, and involve every single resident that wishes to take part in this transformational initiative. From fundraising to expertise in renewable energy, to engineers, social scientists, and experts on HVAC/transportation/grid infrastructure, this will take all Rhode Islanders to make a reality.

Below is just a sample of the questions that need to be answered by the conclusion of Phase II in 2020 in order to make our energy transition vision a reality:

- Where will ground solar panels go? How will that be decided?
- How will electric cars be charged outside of the home?
- How will citizens volunteer for this initiative?
- How will we ensure justice for workers in the old energy system? (fossil fuel industry)
- Will city governments exercise their power to encourage transitioning? (set higher building codes for efficiency or something else)
- Can city residents, city government, and commercial/industrial businesses work together so they all benefit from the energy transition?